Durham

2012

The Division of Water Resources (DWR) provides the data contained within this Local Water Supply Plan (LWSP) as a courtesy and service to our customers. DWR staff does not field verify data. Neither DWR, nor any other party involved in the preparation of this LWSP attests that the data is completely free of errors and omissions. Furthermore, data users are cautioned that LWSPs labeled **PROVISIONAL** have yet to be reviewed by DWR staff. Subsequent review may result in significant revision. Questions regarding the accuracy or limitations of usage of this data should be directed to the water system and/or DWR.

1. System Information

Contact Information

Water System Name:	Durham	PWSID:	03-32-010
Mailing Address:	101 City Hall Plaza Durham, NC 27701	Ownership:	Municipality
Contact Person:	Vicki Westbrook	Title:	Asst. Director, Water Management
Phone:	919-560-4381	Fax:	919-560-4479
Secondary Contact:	Don Greeley, Director	Phone:	919-560-4381
Mailing Address:	1600 Mist Lake Drive Durham, NC 27704	Fax:	919-560-4479

Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	6-8	0.15 %
Cast Iron	6-36	29.00 %
Ductile Iron	2-42	70.00 %
Galvanized Iron	2	0.65 %
Other	6-42	0.20 %

What are the estimated total miles of distribution system lines? 1,186 Miles
How many feet of distribution lines were replaced during 2012? 11,130 Feet
How many feet of new water mains were added during 2012? 97,412 Feet
How many meters were replaced in 2012? 11,088
How old are the oldest meters in this system? 19 Year(s)
How many meters for outdoor water use, such as irrigation, are not billed for sewer services? 2,996
What is this system's finished water storage capacity? 20.000 Million Gallons
Has water pressure been inadequate in any part of the system since last update? No

GIS classification of line type on-going; completed several small projects replacing Asbestos Cement lines. Hillandale Dual Replacement Line project replaced 2 older large distribution lines with 1 new one, reducing the total number of miles of line.

Programs

Does this system have a program to work or flush hydrants? Yes, Annually
Does this system have a valve exercise program? Yes, 2 Years or More
Does this system have a cross-connection program? Yes
Does this system have a program to replace meters? Yes
Does this system have a plumbing retrofit program? Yes
Does this system have an active water conservation public education program? Yes
Does this system have a leak detection program? Yes

Water & Sewer Maintenance has 2 valve crews and 2 valve/leak detection crews. The City is approximately 65% complete with the AMR installation/meter replacement project; information provided by the new technology will help staff aggressively pursue leaks in the system.

Water Conservation

What type of rate structure is used? Increasing Block, Uniform
How much reclaimed water does this system use? 0.003 MGD For how many connections? 0
Does this system have an interconnection with another system capable of providing water in an emergency? Yes

The increasing block (5 tiers) structure is applied to Single Family Residential customers. Non-residential customers are billed at Tier 3 while irrigation customers are billed at Tier 5. Sewer is billed at a uniform rate. Durham operates a bulk reclaimed water station at the North Durham Water Reclamatio Facility.

2. Water Use Information

Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Haw River (02-1)	55 %	Durham	100 %
Neuse River (10-1)	45 %		

What was the year-round population served in 2012? 258,636
Has this system acquired another system since last report? No

Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	78,250	11.434	0	0.000
Commercial	5,928	6.572	0	0.000
Industrial	238	1.320	0	0.000
Institutional	1,420	3.260	0	0.000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? 1.070 MGD

system process water includes 0.47 MGD water used for system maintenance and 0.600 MGD for filter backwash

Water Sales

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Cary	03-92-020	0.884	2	0.000	2028	No	Yes	16	Emergency
Chatham Co	03-19-126	0.000	0	2.000	2028	No	Yes	16	Emergency
Hillsborough	03-68-015	0.000	0	0.000	2008	No	Yes	16	Emergency
Orange-Alamance	03-68-020	0.000	0	0.000	2008	No	Yes		Emergency
OWASA	03-68-010	0.000	0	0.000	2029	No	Yes	12	Emergency

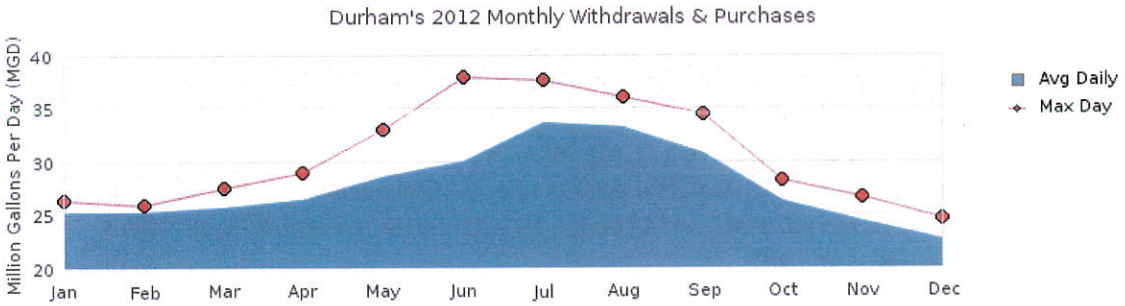
Durham has a Contract with Chatham County with a sliding Scale. 4/1/11 to 3/31/13 - 0 to 2 MGD; 4/1/13 to 3/31/15 - 0 to 3 MGD, and 4/1/13 to 3/31/28 - 2 to 4 MGD.

The City of Durham has a mutual aid agreement with the Orange Alamance Water System; however access to the water would be provided through the interconnection with the Town of Hillsborough.

3. Water Supply Sources

Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	25.190	26.320	May	28.450	33.080	Sep	30.630	34.500
Feb	25.200	25.930	Jun	29.940	38.000	Oct	26.210	28.230
Mar	25.570	27.430	Jul	33.530	37.660	Nov	24.350	26.670
Apr	26.260	28.960	Aug	33.170	36.140	Dec	22.490	24.580



Surface Water Sources

Stream	Reservoir	Average Daily Withdrawal		Maximum Day Withdrawal (MGD)	Available Raw Water Supply		Usable On-Stream Raw Water Supply Storage (MG)
		MGD	Days Used		MGD	* Qualifier	
Cape Fear	Jordan Lake	0.000	0	0.000	10.000	C	100.000
Eno River		0.000	0	0.000	5.000	F	0.000
Eno River	Teer/Hanson Quarry	0.000	0	0.000	5.100	SY50	0.000
Flat River	Lake Michie	23.140	271	45.540	10.500	SY50	2,812.000
Little River	Little River Lake	18.530	213	50.000	17.400	SY50	4,826.000

* Qualifier: C=Contract Amount, SY20=20-year Safe Yield, SY50=50-year Safe Yield, F=20% of 7Q10 or other instream flow requirement, CUA=Capacity Use Area Permit

Surface Water Sources (continued)

Stream	Reservoir	Drainage Area (sq mi)	Metered?	Sub-Basin	County	Year Offline	Use Type
Cape Fear	Jordan Lake	1,690	Yes	Haw River (02-1)	Chatham		Regular
Eno River		144	Yes	Neuse River (10-1)	Durham		Emergency
Eno River	Teer/Hanson Quarry	0	Yes	Neuse River (10-1)	Durham		Emergency
Flat River	Lake Michie	168	Yes	Neuse River (10-1)	Durham		Regular

Little River	Little River Lake	97	Yes	Neuse River (10-1)	Durham	Regular

What is this system's off-stream raw water supply storage capacity? 135 Million gallons
Are surface water sources monitored? Yes, As Needed
Are you required to maintain minimum flows downstream of its intake or dam? Yes
Does this system anticipate transferring surface water between river basins? Yes

Durham's primary water sources are Lake Michie (Flat River) and Little River Reservior (Little River) in the Neuse Basin. Approximately 55% of wastewater flow is discharged into the the Cape Fear Basin through either the South Durham WRF or the Durham County Wastewater Treatment Plant. Durham has a 40 MGD IBT certificate. Durham can access its 10 MGD allocation from Jordan Lake through interconnections with the Town of Cary; water is treated at the Cary-Apex Water Treatment Facility. Currently this is access on an as-needed basis.NOTE: Modeling conducted in 2012 shows 2007-2008 as the drought of record which changes the yields of Lake Michie, Little River and Teer Quarry. LM/LR yields also use 20% safety factor.
The Available Water Supply values for Flat River and Little River are based modeling conducted by Hazen & Sawyer (November 2012) and are consistanct with the Regional Water Supply Plan developed for the Jordan Lake Partnership. Durham has not conducted any studies regarding the Eno River Yield.
Durham has intakes at Lake Michie and Little River. Teer Quarry (filled by Eno River) can currently only be filled using temporary connections, piping and pumps. Durham does not currently have an intake on the Eno River.
Durham's terminal reservoirs at the Brown (90 MGD) and Williams (45 MGD) Water Treatment Plants have a combined raw water storage capacity of 135 MG.

Water Purchases From Other Systems

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Cary	03-92-020	3.276	2	0.000	2028	Yes	Yes	16	Emergency
Chatham Co	03-19-126	0.000	0	0.000	2028	Yes	Yes	16	Emergency
Hillsborough	03-68-015	0.000	0	0.000	2008	Yes	Yes	16	Emergency
Orange-Alamance	03-68-020	0.000	0	0.000	2008	Yes	Yes	16	Emergency
OWASA	03-68-010	0.000	0	0.000	2029	Yes	Yes	12	Emergency

Water Treatment Plants

Plant Name	Permitted Capacity (MGD)	Is Raw Water Metered?	Is Finished Water Ouput Metered?	Source
Brown Water Treatment Plant	30.000	Yes	Yes	Lake Michie, Little River
Williams Water Treatment Plant	22.000	Yes	Yes	Lake Michie, Little River

Did average daily water production exceed 80% of approved plant capacity for five consecutive days during 2012? No
If yes, was any water conservation implemented?
Did average daily water production exceed 90% of approved plant capacity for five consecutive days during 2012? No
If yes, was any water conservation implemented?
Are peak day demands expected to exceed the water treatment plant capacity in the next 10 years? Yes

A planned expansion of the Brown Treatment Plant for 12mgd will address the peak demands.

4. Wastewater Information

Monthly Discharges

	Average Daily Discharge (MGD)		Average Daily Discharge (MGD)		Average Daily Discharge (MGD)
Jan	18.020	May	16.630	Sep	17.420
Feb	18.350	Jun	15.110	Oct	16.060
Mar	20.940	Jul	14.870	Nov	15.190
Apr	17.100	Aug	15.620	Dec	16.210

How many sewer connections does this system have? 81,297
How many water service connections with septic systems does this system have? 4,262
Are there plans to build or expand wastewater treatment facilities in the next 10 years? Yes

Plans for upgrades at both NDWRF and SDWRF to meet more stringent limits for biological nutrient removal. No capacity increase is planned.

Wastewater Permits

Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0023841	20.000	20.000	8.050	15.870	Ellerbee Creek	Neuse River (10-1)
NC0047957	20.000	20.000	8.750	16.720	New Hope Creek	Haw River (02-1)

The discharge points for the two WRFs are directly adjacent to the WRFs.

Wastewater Interconnections

Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Durham Co. WWTP	03-32-010	Discharging	3.980	365	0.000

Durham does not have normal interconnections with the Durham County WWTP. There are customers in the City limits whose waste eventually flown - through both City owned/maintained pipes and County owned/maintained pipes into the County WWTP for treatment.

Population served is approximately 95% of the Durham County population (City + County).
The Water System map includes the locations of the City's two water reclamation facilities – North Durham WRF and South Durham WRF. The map also indicates two manholes located at the edge of the City's service area. These manholes are the central collection points – by gravity flow – from the City's collection system into the County's collection system. Wastewater flows to the Durham County owned and operated Triangle Wastewater Treatment Plant

5. Planning

Projections

2012	2020	2030	2040	2050	2060

Year-Round Population	258,636	286,419	329,421	372,423	415,425	458,426
Seasonal Population	0	0	0	0	0	0
Residential	11.434	15.470	17.460	19.370	21.190	22.920
Commercial	6.572	7.190	8.400	9.500	10.530	11.490
Industrial	1.320	1.240	1.470	1.680	1.890	2.070
Institutional	3.260	2.190	2.410	2.630	2.840	3.050
System Process	1.070	1.040	1.160	1.300	1.420	1.510
Unaccounted-for	4.274	2.539	2.946	3.350	3.743	4.151

The general trend in industry is toward less water use, recycling water within the process and for Durham (in RTP area specifically) use of reclaimed water to off-set cooling water use. The industries that located in Durham have recently been mostly high tech with low production water use.
The major institutional users are the local universities, medical centers and school system. Duke University & Medical Center has invested in a number of strategies to reduce their use of potable water; this includes cisterns and storm water ponds for cooling towers. Additionally, as drought progressed in 2008, they retrofitted all the dorms with water efficient fixtures and are considering evaluating other opportunities. Durham Public Schools are continuing to reduce water use on site and this trend is expected to continue.

Future Water Sales

Purchaser	PWSID	MGD	Contract Year Begin	Year End	Pipe Size(s) (Inches)	Use Type
City of Raleigh	03-92-015	6.500	2010		24	Emergency

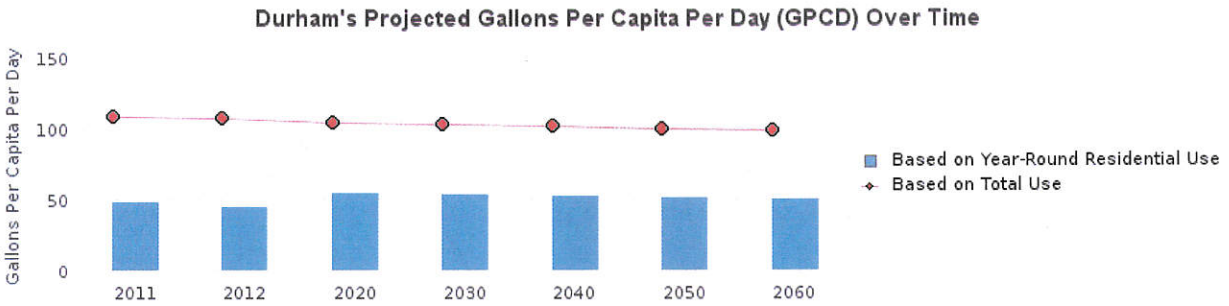
Durham will be submitting a request to retain their current 10 MGD allocation from Jordan Lake and obtain an additional 6.5 MGD allocation - for a total of 16.5 MGD from Jordan. Durham anticipates constructing a new intake on the western side of Lake Jordan with a subset of its Jordan Lake Partners to withdraw the full 165.5 MGD allocation of raw water. The Partners will also evaluate the potential construction of a shared water treatment plant near the intake structure. Studies are underway and Partners anticipate moving forward with recommendations upon approval by the EMC of the additional allocation requests.
Phase II of the US Raleigh Interconnect (24 in) still under construction.

Future Supply Sources

Source Name	PWSID	Source Type	Additional Supply	Year Online	Year Offline	Type
Jordan Lake	03-32-010	Surface	6.500	2030		Regular

Demand v/s Percent of Supply

	2012	2020	2030	2040	2050	2060
Surface Water Supply	37.900	37.900	37.900	37.900	37.900	37.900
Ground Water Supply	0.000	0.000	0.000	0.000	0.000	0.000
Purchases	0.000	0.000	0.000	0.000	0.000	0.000
Future Supplies		0.000	6.500	6.500	6.500	6.500
Total Available Supply (MGD)	37.900	37.900	44.400	44.400	44.400	44.400
Service Area Demand	27.930	29.669	33.846	37.830	41.613	45.191
Sales	0.005	0.000	0.000	0.000	0.000	0.000
Future Sales		0.000	0.000	0.000	0.000	0.000
Total Demand (MGD)	27.935	29.669	33.846	37.830	41.613	45.191
Demand as Percent of Supply	74%	78%	76%	**85%**	**94%**	**102%**



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is 44 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here.

Are there other demand management practices you will implement to reduce your future supply needs? Currently Durham has a relatively aggresive water conservation/efficiency program which incentivizes the replacement of water wasting devices with more efficient fixtures (toilets, showerheads, faucets). The City also implements a tiered rate system for single family residential customers which will be expanded in coming years to include non-residential customers. The odd-even watering schedule is also helping to offset demand and as housing stock is replaced/remodeled; efficient fixtures are being installed. The City is in the midst of kicking off a Master Planning effort for Reclaimed Water.

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs? Reclaimed water

How does the water system intend to implement the demand management and supply planning components above? Durham's City Council is supportive of ensuring that Durham is a sustainable community as stated in the City's Strategic Plan. Continuing support of modest rate increases to support necessary capital improvement projects is anticipated.

Additional Information

Has this system participated in regional water supply or water use planning? Yes, Jordan Lake Partnership, Triangle J Resources Planning Committee, Triangle Area Water Supply Monitoring Program, Upper Neuse River Basin Association

What major water supply reports or studies were used for planning? Jordan Lake Allocation Plan, Teer Quarry Water Supply Plan, Kerr Lake Study and the Durham Water System Report

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues: Expansion of City of Durham's Brown Water Treatment Plant and completion of Interconnection with the City of Raleigh

directed to the water system and/or DWR.